

6. New features of buyers' choice of housing The war has forced people to be more careful about investing in real estate. Those who still decide to buy housing prefer ready-made apartments or housing with a high degree of readiness mainly in the western or central regions of Ukraine or in Kyiv.

7. Changes in urban planning legislation. The reform of the urban planning industry continues during the war. Since the beginning of the full-scale invasion, many regulations in urban planning have been adopted, some of which regulate legal relations during martial law, and the other will remain in force after its completion. The priority is the reconstruction of the country, the implementation of new security and civil protection standards, the facilitation of permits, the deepening of digitalisation and the further development of the Unified State Electronic System in the field of construction, which should contribute to transparency, legality and the elimination of corruption.

Preparation for post-war reconstruction Thus, it is advisable to start planning the reconstruction of the country without waiting for the end of the war. The process has already begun with the creation of the "Ukraine Recovery Plan", which defines a list of National Programs to achieve key results. U-LEAD with Europe has started providing support to 24 selected municipalities in the development of Comprehensive Territorial Recovery Programmes and Community Recovery and Development Plans. The Programme for the Comprehensive Restoration of the Territory is an analytical and spatial document that defines the main urban planning and socio-economic priorities of the policy of restoring the territory affected by armed aggression. The Community Recovery and Development Plan is a strategic planning document that will include tasks and measures for recovery and development, local development projects

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MODERN APPROACHES TO ANALYSIS AND ENSURING THE ACCURACY OF MECHANICAL PROCESSING ON CNC EQUIPMENT

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The accuracy of the shape and dimensions of a part manufactured on numerically controlled (NC) equipment depends on a fairly large number of factors [4]. Errors occur at different stages of the life cycle of a technological system but

manifest themselves during the operation of the machine. In [5], a system model of error occurrence is presented, which is based on the assumption that the accuracy of forming parts during mechanical processing is influenced by all elements of the technological system. The system model includes thermal, force, dynamic, geometric and other indicators of technological systems that generate the corresponding production errors.

Thus, errors in positioning the cutting tool lead to distortion of the shape of the surfaces. Technological processes for machining parts of complex shape are especially sensitive to such errors in tool dimensional adjustment – for example, instead of a spherical surface, you can get either a convex or concave surface. In this case, the deviation from roundness is approximately equal to the error in positioning the tool [2].

Obviously, the most significant contribution to the error in the machining of workpieces during the operation of the equipment is made by force (including vibration) and temperature factors. In the article [13], a multiple linear regression model was applied to thermal error compensation problems. The issue of the suitability of the calculation speed of the compensation model for real-time application was investigated. The issue of the suitability of the calculation speed of the compensation model for real-time application was investigated. In the article [9], a dynamic model of the thermal error of the spindle assembly is proposed, which is based on the processing of experimental data.

Neither the workpiece nor the structural elements of the machine tool are absolutely rigid bodies, so elastic deformations of both the workpiece and the equipment occur during the forming process. It should also be borne in mind that the workpiece, if a sufficiently large layer of material is removed from it, is a body with a time-varying stiffness, because with the removal of the allowance, its cross-sectional area decreases [3]. Also, elastic deformations of the workpiece can occur due to the fact that at the point of its contact with the clamping tool there are local defects in the shape and mechanical properties of the surfaces, so the contact "workpiece-clamping tool" is not absolutely rigid [8].

Regarding the influence of temperature factors on machining errors, studies have shown that, for example, a change in the temperature of the lubricant in the bearing units of a grinding machine by 1 °C leads to a displacement of the front end of the spindle by 1...2.5 μm, which, in turn, leads to a certain error in shaping [7].

To increase the accuracy of machining on CNC equipment, both passive and active methods of reducing the impact of negative factors can be used.

Passive methods include, for example, manufacturing structural elements of equipment from materials that effectively absorb (dissipate) vibration energy. Thus, studies have shown that the use of gray cast iron as a structural material allows for a significant increase in the dissipation of vibration energy, because gray cast iron has a vibration decrement (damping rate coefficient) 5-6 times higher than steel [6]. There is also an opinion that structural elements made of powder and composite materials, due to their porous structure, also contribute to the dissipation of vibration energy.

Regarding active methods, there is a method of damping unwanted vibrations of the “tool-workpiece” system by adjusting the cutting mode [1]. Despite the positive test results, this method still requires adjustment of the cutting mode and therefore may affect the production rate. Methods for compensating for kinematic errors have developed significantly in recent years. These errors lead to distortion of the tool trajectories due to disruption of synchronization of movements of individual axes, formation of transient processes, as well as due to the occurrence of servo errors during non-stationary axis movement [10]. In [11], a set of new approaches to predicting and compensating contour errors using machine learning technologies is presented. Using the internal data of the CNC system, the feed axis tracking error is modeled as a nonlinear autoregressive network that considers all nonlinear errors of the feed axis. A similar problem based on a dynamic servo error model is investigated in the work [12].

Thus, it can be stated that modern approaches to ensuring the accuracy of machining on CNC equipment are based on the application of methods for compensating for errors arising from the action of various physical factors. These approaches involve solving the problem of increasing the accuracy of CNC equipment by combining known design and organizational solutions with the methods for adjusting the CNC equipment control process.

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NEW FLOCCULANT FOR RESOURCE-EFFICIENT HANDLING OF RECYCLED FIBER IN CARDBOARD PRODUCTION

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Production of paper and cardboard from waste paper is one of the important directions of development of the domestic pulp and paper industry, which ensures independence from imported expensive pulp. The use of secondary raw materials has significant advantages, as it allows to significantly reduce the amount of solid household waste that ends up in landfills. However, waste paper pulp, compared to primary cellulose, is characterized by lower strength indicators due to repeated mechanical and temperature loads on the fibers during their cyclic use. Each subsequent cycle of using cellulose fiber is accompanied by its shortening and loss of paper-forming properties [1, 2].

Therefore, an important stage in the production of paper and cardboard from waste paper is to ensure the proper strength of the finished product. This can be